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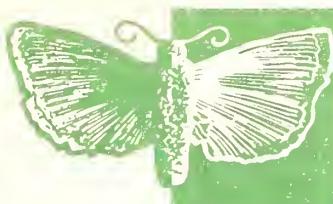
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forest pest management methods application group

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NEWSLETTER

IPIAS COMES TO RED RIVER

The dispatcher was sending out fire crews and pinpointing the location of new smokes on Green Mountain as they were being called in from surrounding fire towers. It was only July and already it was promising to be a record fire season. In the basement of the same building, a team of scientists were assembling the components of the latest version of a computerized pest impact assessment system.

This was the scene during most of July in the old log building which still serves as the headquarters of the Red River Ranger District on central Idaho's Nezperce National Forest. Located in the heart of one of Idaho's largest National Forests, the Red River District is one of the more remote districts in the National Forest System. Two out of every five acres on the district are in wilderness areas. The nearest community of any size is Grangeville, an hour and a half drive to the west. To the east, a narrow gravel road winds its way between two large wilderness areas and eventually ends up in Darby, Montana, 113 miles away.

Despite this relative isolation, the staff of the Red River District is successfully using state-of-the-art technology to integrate impacts of forest pests into forest planning and pest management decision making. During 1984, the Red River District

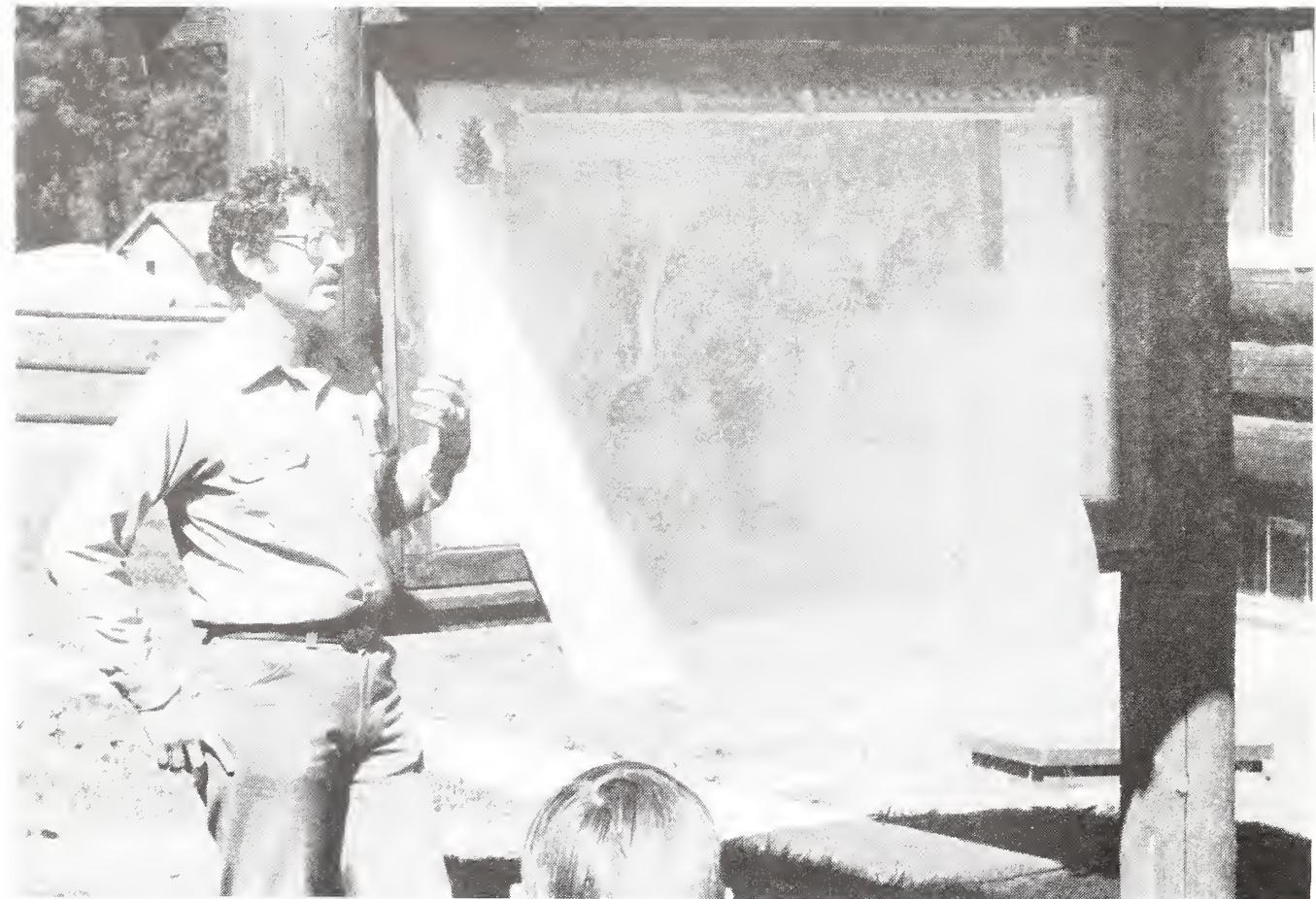
was selected as the site for a demonstration of the Integrated Pest Impact Assessment System (IPIAS), which is being developed by MAG. This system links a series of pest, growth and yield, and socioeconomic models to project the consequences of a pest outbreak and the consequences of alternative pest management tactics. Areas are identified for appropriate impact analyses using a geographic information system.

The Red River District was a natural for this demonstration. In recent years, the mountain pine beetle has reached epidemic proportions in the mature and overmature lodgepole pine stands which make up a significant proportion of the district's forest cover. In addition, the district has a number of unique resource values in addition to a large timber base which must be considered in an overall resource management program. For example, the Red River is one of the few remaining rivers in Idaho which still supports a spring and summer run of Chinook salmon. If new roads are constructed in areas of highly erosive soil to salvage trees killed by the mountain pine beetle, increased sedimentation could adversely affect water quality and the salmon run. The district also has a sizeable moose herd and certain areas serve as key elk migration routes.

For several hectic weeks a group composed of Bill White of MAG, Don

Hunter of the Western Energy and Land Use Team of the U.S. Fish and Wildlife Service, Terry Daniels of the University of Arizona, and Wayne Bousfield of the Northern Region's Cooperative Forestry and Pest Management Staff in Missoula, Montana, teamed up with the district's staff to install the components of IPIAS, including an 18 data theme geographic data base, on the district's Data General MV4000 computer. Within a short time

district silviculturist, Bruce Short, and wildlife biologist, Paul Moroz, were effectively using the system to plan mountain pine beetle salvage sales and prepare an environmental assessment for a district wide mountain pine beetle management program. They provided an impressive demonstration of their newly acquired skills when the IPIAS Steering Committee and others interested in this technology recently visited the District.



District Silviculturist Bruce Short describes the current mountain pine beetle problem on the Red River Ranger District, and its impact on the district's resource management activities.



Against the backdrop of the Galena Sale Area IPIAS demonstration site, Wildlife Biologist Paul Moroz explains how mountain pine beetle salvage sales might impact wildlife habitat.

ROOT DISEASE LOSSES

If an intermediate cutting is made in a stand of mixed conifers in northern Idaho that is infected with root disease pathogens, what will happen to the residual trees? Some recent observations on the Idaho Panhandle National Forests indicate that the end result could be devastating. An evaluation is being conducted by Sue Hagle and Jim Byler, plant pathologists with the

Northern Region's Cooperative Forestry and Pest Management Staff in Missoula, Montana, to obtain some definitive data.

Root disease has been known to be a major pest problem on the Idaho Panhandle National Forests for a number of years. In 1984 this evaluation was begun by Sue Hagle to measure annual mortality rates due to root disease following intermediate cuttings. Rates of

tree deterioration are also being measured. These data will be of value when conducting surveys of root disease caused tree mortality over large areas. Present plans are to measure mortality rates over a five year period in an evaluation site which comprises two large drainages. The first years data has established that there is a high incidence of root disease in the area, especially in the moist habitat types.

AN UPDATE ON RED SPRUCE DECLINE

Decline and mortality of red spruce in the eastern United States is receiving a great deal of attention, both by the scientific community and by the news media. The following sections are an update on activities designed to monitor and inventory this condition by Forest Pest Management Staff Groups in the Northeastern Area and Southern Region.

Northeastern States

During 1984, an extensive inventory of decline and mortality of red spruce and balsam fir was conducted in three northeastern states. This inventory was conducted under the leadership of the Forest Pest Management Field Office, Northeastern Area in Durham, New Hampshire, in cooperation with state forestry agencies from the three states involved, MAG, and the Nationwide Forestry Applications Program. The first phase of this inventory is now completed and an interim report has been issued by Field Office Representative Mel Weiss and his staff. The inventory was conducted in order to obtain some definitive data on the status of a highly publicized decline of red spruce in the mountain regions of New Hampshire, New York, and Vermont, which some investigators have suggested may be caused by acid rain or other atmospheric pollutants.

This survey indicates that red spruce decline and mortality is present to some degree in all areas surveyed; the Adirondack Mountains and Tug Hill Plateau regions of New York, the White Mountains of New Hampshire, and the Green Mountains of Vermont. One of the more significant findings is that areas of heaviest decline and mortality also had the highest proportion of plots that were adequately stocked with spruce and fir regeneration.

While the field survey was being conducted, some members of Weiss's staff conducted an exhaustive search of the literature describing past episodes of spruce and fir mortality. Their search turned up a number of reports of widespread decline and mortality that have occurred since the late 1800's. Some were the result of catastrophic outbreaks of insects such as the Northeastern States

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Red spruce in various stages of decline on the Camels Hump in Vermont.

Branch dieback on red spruce on the Monongahela National Forest in West Virginia.

This year a series of supplemental surveys are underway to locate areas of heavy decline and mortality in selected areas such as the Green and White Mountain National Forests. In addition, Margaret Miller-Weeks, a plant pathologist on the staff of the Durham Forest Pest Management Field Office is visiting areas of heavy decline and mortality to identify insects, diseases, and other agents which might be associated with this condition.

West Virginia

Approximately 100,000 acres of red spruce forest occurs in the high mountain regions of the Monongahela National Forest and adjoining state and private lands in West Virginia. These stands are somewhat unique in that, except for a few isolated bogs, there is no balsam fir present. Decline and mortality of red spruce has also been reported in this area. Manfred Mielke, a plant pathologist with the Morgantown, West Virginia Forest Pest Management Field Office, is providing leadership to a survey that is being conducted to determine the extent of spruce decline and mortality in West Virginia. MAG and West Virginia University personnel are cooperative in this survey.

During 1984, high altitude panoramic color-IR aerial photo coverage of all the spruce type in West Virginia was obtained in conjunction with a multi-stage survey of gypsy moth defoliation. This photography was used to identify the spruce type and stratify it into mortality classes. A subsample of ground plots are now being established in each of these strata.

One of the more frequently occurring symptoms associated with declining spruce in West Virginia is a random dying of branches throughout the crown. This is characteristic of damage caused by *Cystospora* canker

on spruce. However, the causal agent has not yet been identified. One of the objectives of this inventory is to identify the fungi associated with this branch dieback, as well as other insects and diseases associated with red spruce.

Southern Appalachians

The high peaks and ridges of the Southern Appalachian Mountains of southwestern Virginia, western North Carolina, and eastern Tennessee, contain extensive stands of red spruce and Fraser or southern balsam fir, *Abies fraseri*. A number of investigators have focused their attention on the condition of red spruce in these areas in recent years. The condition of the high elevation forests of the Southern Appalachians is confounded by the presence of the balsam woolly adelgid, *Adelges piceae*, a stem infesting insect native to Europe which has caused extensive mortality of the Fraser fir component of these stands since the late 1950's. Denny Ward and the team from the Southern Region's Doraville, Georgia Forest Pest Management Field Office are conducting a series of surveys using color-IR aerial photos and ground data to better document the mortality present in these stands.

NORTHERN HARDWOOD DECLINE

An apparent increase in the incidence of dieback and mortality of northern hardwoods, principally sugar maple, has been reported in recent years in several northeastern states. Once again, the factors responsible for this condition are not clearly understood. There is some evidence that the decline may be associated with past outbreaks of defoliating insects such as the forest tent caterpillar or the saddled prominent. Other investigators have suggested drought, salt deposits along roadsides, and



Sugar maples with branch dieback near Chittenden, Vermont.

stress, caused by atmospheric pollution, as possible factors.

Approximately 30,000 acres of northern hardwood dieback and mortality was mapped by personnel of the Vermont Department of Forests, Parks and Recreation in 1984. This year, a statewide inventory, using a combination of aerial photography and ground surveys will be conducted in Vermont to obtain data on the extent and distribution of this decline. The survey will be a cooperative effort involving MAG, the Durham, New Hampshire Forest Pest Management Field Office of the Northeastern Area, and the State of Vermont. The aerial photography is presently being acquired. Photo interpretation is scheduled for the fall and winter months, and ground data will be collected next spring.

MEXICAN VISITORS

During June, a team of 21 representatives of Sanidad Forestal, the Mexican counterpart of our own Forest Pest Management organization, visited the Southwestern Region to observe a variety of forest pest management activities. The team was made up of foresters, biologists, entomologists, and plant pathologists from Mexico City and a number of field locations throughout Mexico. The interchange was organized by Doug Parker, Forest Pest Management Director for the Southwestern Region in Albuquerque. Bill Ciesla, MAG Group Leader, spent a day with the team and briefed them on the uses of aerial photography in forest pest management.

The visit provided the opportunity for some lively discussions on approaches to forest pest management on both sides of the border. Many of Mexico's forest pests are quite similar to ours. Several species of barkbeetles (descortesadores) and dwarf mistletoes (muerdagos) effect their pine forests. Recently a

decline syndrome has been discovered in high elevation forests of sacred fir, (*oyamel*), *Abies religiosa*, which surround Mexico City. This is believed to be related to high concentrations of photo-oxidants and other air pollutants.

AERIAL PHOTO TRAINING

During April, MAG sponsored a training session on the use of aerial photography in forest pest management for the Forest Pest Management Staff of the Alaska Region and their key cooperators. Ten students participated. The two day course included both lectures and laboratory exercises which were specifically tailored to conditions in Alaska.

PUBLICATIONS

Ciesla, W.M., M.A. Marsden, and R.J. Myhre. 1985. Color-IR aerial photos for assessment of dieback and mortality in northern hardwood forests. USDA Forest Service, FPM/MAG, Fort Collins, CO. Rpt. 85-5.

Hamilton, D.B., J.E. Roelle, and W.B. White. 1985. Mountain pine beetle damage and contagion modeling: some concepts and approaches. USDA Forest Service, FPM/MAG, Fort Collins, CO. Rpt. 85-6.

Lessard, G., D.W. Johnson, T.E. Hinds, and W.H. Hoskins. 1985. Association of *Armillaria* root disease with mountain pine beetle infestations on the Black Hills National Forest, South Dakota. USDA Forest Service, FPM/MAG, Fort Collins, CO. Rpt. 85-4.

PEOPLE

Bov B. Eav has joined the MAG staff as a Mathematical Statistician. A native of Cambodia, he earned

Masters and Doctors degrees in Forest Biometry from the State University College of Environmental Science and Forestry at Syracuse University. Bov is no stranger to MAG activities; he was previously employed by the Lockheed Corporation in Houston, Texas. One of his duties at Lockheed was to be part of

a team on contract to the Forest Service Nationwide Forestry Applications Program. During this association he was involved in the analysis of mountain pine beetle loss assessment data acquired with high altitude panoramic aerial photography and co-authored several reports on the subject.



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Students make counts of trees killed by spruce beetle on color-IR photos, taken over Alaska's Glacier Bay National Park, during an aerial photo training session held in Juneau, Alaska.

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